Dryden Flight Research Center
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DRYDEN CENTERWIDE PROCEDURE

CODE S

RESPIRATORY PROTECTION

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1.0 INTRODUCTION

1.1 Purpose

This DCP establishes the DFRC Respiratory Safety Program and complies with regulatory requirements of the Federal Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH) guidelines, and NASA directives.

1.2 Applicability

This DCP applies to all persons at DFRC controlled locations, including contractors, visitors, and experimenters who require the use of respiratory equipment. The use of respirators shall be based upon Permissible Exposure Limits (PELs), Threshold Limit Values (TLV®), and/or whether an environment is considered Immediately Dangerous to Life or Health (IDLH).

1.3 Scope

This DCP establishes procedures, documentation, training, and medical clearance requirements as well as assigning responsibility for the development and maintenance of the DFRC Respiratory Protection Program.

2.0 APPLICABLE DOCUMENTS

2.1 Authority Documents

29 CFR 1910.134: Respiratory Protection. This CFR establishes that employer's institute a respirator program when employees are required to utilize respiratory protective equipment.

29 CFR 1910.1000, Air Contaminants: This CFR lists air contaminants and their exposure limits.

42 CFR 84, Approval of Respirator Protective Devices: This CFR establishes the manufacture, testing, and maintenance standards for respiratory equipment.

29 CFR 1910.1200, Hazard Communications: This CFR establishs the procedures for communicating information to employees by the employer of all hazardous chemicals and substances used in the work place.

State of California, CCR 8, Section 5144

ANSI Z88.2-1991, Practices for Respiratory Protection. Portions of this standard are authoritative when "incorporated by reference" by OSHA or NASA.

NIOSH, Department of Health and Human Services Document 96-101. Selection and use of Particulate Respirators. This publication is certified under 42 CFR 84.

American Conference of Governmental Industrial Hygienists (ACGIH), Industrial Ventilation, Current Edition. Portions of this ACGIH guideline are "incorporated by reference" by NASA as authority for ventilation requirements.

Dryden Centerwide Procedure: DCP-S-038, Hazard Communication.

Dryden Centerwide Procedure: DCP-S-022, Confined Space.

3.0 DEFINITIONS

3.1 Air-purifying respirator: A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants.

3.2 Atmosphere-supplying respirator. A respirator that supplies the user with breathing air from a source independent of the ambient atmosphere; includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA).

3.3 Canister or cartridge. A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air.

3.4 Demand respirator: An atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

3.5 End-of-service-life indicator (ESLI): A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

3.6 Filter or air purifying element: A component used in respirators to remove solid or liquid aerosols from the inspired air.

3.7 Fit test: The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

3.8 High efficiency particulate air (HEPA) filter: A filter that is at least 99.97% efficient in removing monodisperse particles of greater than 0.3 micrometers in diameter.

3.9 HUMO: Health Unit Medical Officer.

3.10 Immediately Dangerous to Life or Health (IDLH): A condition that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent or adverse health effects or prevent escape from such an environment in the event of the failure of respirator protection equipment.

3.11 Negative pressure respirator: A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to ambient pressure.

3.12 Oxygen deficient atmosphere: An atmosphere with an oxygen content below 19.5 % by volume.

3.13 PEL: Permissible Exposure Limits. PEL standards are listed in 29 CFR 1910.1000 Tables Z-1, Z-2, and Z-3.

3.14 Positive pressure respirator: A respirator in which the pressure inside the respirator is greater than ambient.

3.15 Self-containing breathing apparatus (SCBA): An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

3.16 Supplied-air-respirator (SAR) or airline respirator: An atmosphere-supplied respirator for which the source of breathing air is not designed to be carried by the user.

3.17 TLV® : Threshold Limit Value; the level of exposure, day after day, under which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. Usually listed for a Time Weighted Average (TWA) concentration such as for 8 hour workday and 40 hour work week.

4.0 ROLES and RESPONSIBILITIES

4.1 Overview

The chain of responsibility for ensuring that there is a safe work environment at DFRC that follows required safety standards, regulations, codes, and guidelines starts with the Center Director and flows downward through management to supervisors. In addition, each person who works at DFRC must understand that a "condition of employment" is to observe all safety specifications applicable to the task being performed.

4.2 Directorates and Single Letter Offices

Directorates and Single Letter Offices shall develop safety measures that ensure personnel under their supervision are not exposed to hazardous airborne contaminants. The order of preference to eliminate or control air contaminants are:

- Engineering controls.
- Administrative controls.
- Respiratory Protection Equipment.

4.3 Program or Project Managers

Program or Project Managers shall ensure that training, respiratory equipment, and fit testing is provided to employees where required.

4.4 Office of Safety and Mission Assurance

4.4.1 The Safety, Health, and Environmental Office has safety oversight for the Respirator Program at DFRC and shall:

- Appoint a Respirator Program Administrator for the management of the DFRC Respirator Program.
- Provide program surveillance and evaluation.
- Evaluate and update the Respirator Program as necessary to meet regulatory requirements.

4.4.2 Respirator Program Administrator is tasked with:

- Providing baseline surveys of operations, tasks, or work places to determine the potential to create or contain harmful air contaminants.
- Making these surveys available to responsible management, site managers, supervisors, and employees.
- Making recommendations for control or elimination of any harmful air contaminants found.
- Selecting the type respirator that best meets the needs of the employee.
- Ensuring training and certification for all personnel at DFRC who are required to use a respirator.
- Providing work-site-specific procedures and elements for required respiratory use.
- Providing technical information regarding the selection, use, fit, maintenance and care, testing and checking, and limitations of respirators to both supervisors and employees.
- Conducting evaluations of workplaces to ensure that the written respiratory protection program is being properly implemented. See 29 CFR 1910.134 (l) for evaluation requirements.
- Maintaining appropriate documentation and records of workplace surveys in accordance with 29 CFR 1910.1020 and the Privacy Act of 1974.

4.5 Health Unit

Each employee who is required to wear a respirator shall be given a medical evaluation by the Health Unit Medical Officer (HUMO) or his/her designeee, before the employee may be fitted with and permitted to use a

respirator and annually thereafter. The evaluation shall comply with protocols established by OSHA and NASA directives.

4.6 Supervisors

Supervisors are responsible for:

- Identifying personnel who work in areas or jobs requiring respiratory protective equipment.
- Ensuring that each worker who uses respiratory equipment receives a physical evaluation, is trained, fit tested and follows appropriate respirator safety procedures.
- Enforcing the wearing of appropriate personal protective equipment, including respirators.
- Ensuring that appropriate warning signs are posted where breathing atmospheres require the use of respirators.
- Notifying the Safety Office of any incidents or near-misses resulting from the use or non-use of respirators.
- Obtaining the appropriate supervisor respirator training.

4.7 Employee Responsibilities

Employees who use respirators are responsible for:

- Following the procedures of this DCP and other documents that provide guidance for the use and care of assigned respirator/s.
- Cooperating with supervisors, medical, and safety personnel to prevent exposure to harmful breathing environment.
- Notifying supervisors of known or suspected respiratory hazards or change in health that would preclude the use of a respirator.
- Assuring they have met the medical, training, and fit testing requirements annually.

5.0 RESPIRATORY PROTECTION PROGRAM

This section establishes the elements of the DFRC Respiratory Protection Program.

5.1 Engineering Controls

The use of engineering controls is the primary means of protecting workers from hazardous air contaminants. Engineering controls may include the following:

5.1.2 Facility design shall be a consideration for processes that create air contaminants. Facility design reviews shall determine if adequate ventilation exists to eliminate air contaminants and to ensure that processes that create hazardous air contaminants are located away from other workers.

5.1.3 The selection, modification, and operation of equipment that reduces the amount or precludes the production of air contaminants.

5.1.4 The use of materials that produce the least air contaminants and meet the needs of the process.

5.2 Administrative Controls

Administrative controls include:

5.2.1 Changing work schedule to minimize exposure to air contaminants i.e., conduct operations that produce hazardous air contaminants during non-duty hours.

5.2.2 Ensuring workers have proper training and are aware of respiratory contaminants and hazards. (See DCP-S-038, Hazard Communication).

5.3 Respiratory Protection

5.3.1 Respiratory protection will be used:

- During the period of time when engineering controls are being implemented.
- When existing engineering and administrative controls are not completely adequate.
- When or where engineering and administrative controls are not feasible.

5.3.2 Respiratory protection equipment will be required by DFRC whenever:

- Personnel are required to work in hazardous atmospheres.
- When an air contaminant exceeds TLV® or PEL, whichever is the lower.
- When the oxygen content by volume drops below 19.5 percent.
- During handling, transfer, or use of a hazardous chemical where the toxicity of the chemical would cause the risk of injury in the event of a release of the chemical such as in the case of a leak or spill.
- During confined space entry where you may not know the concentration of oxygen or air contaminants . (See DCP-S-022, Confined Space, for details.)
- When requested by an employee. (An employee may request a respirator when one is not actually required.)

5.4 Medical Evaluation

5.4.1 Dryden personnel, both government and contractors, whose job requires them to use a respirator shall receive a medical evaluation to determine if the employee has any detected medical conditions which would preclude the employee from wearing a respirator. The medical evaluation will be provided, upon request, when the individual is identified by their supervisor as being assigned to tasks requiring the use of respiratory protection equipment.

5.4.2 The employee's supervisor or the DFRC Respirator Program Administrator shall provide the HUMO with the following information before the HUMO makes a recommendation concerning the employee's ability to wear the proposed respirator.

- The type and weight of the respirator to be used.
- The duration and frequency the respiratory will be worn.

- The physical work effort by the employee when wearing the respirator.
- Any other information that could have an influence on the HUMO's recommendation.

5.4.3 As a minimum, the medical evaluation will include those mandatory items listed in 29 CFR 1910.134, Sections 1 & 2, Part A of Appendix C or an initial medical examination that obtains the same information. The HUMO will ensure that a follow-up medical examination is provided for an employee who gives a positive response to the initial medical evaluation. The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the HUMO deems necessary to make a final determination. The results of the medical evaluation and any follow-up information will be placed in the individual's medical file.

5.4.4 The HUMO will make a written recommendation regarding the employee's ability to use a respirator. This recommendation will be limited to:

- A recommendation of whether or not the employee is medically capable of wearing the proposed respirator.
- Any limitations on respirator use related to the medical condition of the employee or to the workplace conditions in which the respirator will be used.
- The need, if any, for follow-up medical evaluation.
- A statement that the HUMO has provided the employee with a copy of the written recommendation.

The HUMO shall provide the supervisor and the DFRC Respirator Program Administrator with a copy of the written recommendation before the employee may be trained and fit tested for the proposed respirator.

5.4.5 Employees required to wear respirators at DFRC shall receive an annual medical evaluation. A medical re-evaluation is required sooner if:

- An employee reports medical signs or symptoms that are related to his/her ability to use the assigned respirator.

- The HUMO, supervisor, or Respirator Program Administrator notifies the employee's supervisor that the employee needs to be re-evaluated.

- Information from the Respirator Program Administrator, including observations made during fit testing and program evaluation, indicates a need for employee re-evaluation.

- A change occurs in workplace conditions or that may result in a physical or emotional burden placed on the employee.

- A change is perceived by the employee which may result in an additional burden on the employee.

5.5 Respirator Equipment Selection

The Respirator Program Administrator or designee will review the conditions in which the employee will be using the respirator and advise the employee of the type respirator required. The employee may select a respirator from several models, if available, that are of the required type. Respirators and filters used at DFRC shall meet standards listed in 42 CFR 84 and NIOSH Publication No. 96-101, as appropriate.

5.6 Training and Fit Testing

5.6.1 The Respirator Program Administrator will ensure that employees and their supervisors receive training on the proper use and care of respirator equipment before the first use and annually thereafter. Training will be conducted in a manner that is understandable to the employee. Following training the Respirator Program Administrator will assure that the employee can demonstrate knowledge of at least the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.

- What the limitations and capabilities of the respirator are.

- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.

- How to inspect, put on and remove, use, and check the seals of the respirator.

- What the procedures are for maintenance and storage of the respirator.

- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

5.6.2 A new employee may be exempt from receiving training if he/she has had appropriate respirator training in the last 12 month and can demonstrate knowledge of the items listed above and has documentation of the training from a qualified trainer. The employee must, however, receive training within 12 month from the date of the previous training in order to continue to use the respirator.

5.6.3 Retraining shall be administered when:

- Changes in the workplace or the type of respirator render the previous training obsolete.
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill needed to safely use the respirator.
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

5.6.4 Fit testing is required prior to an employee using any respirator with a negative or positive pressure tight-fitting facepiece. Fit testing will be accomplished by the Respirator Program Administrator or designee. The Respirator Program Administrator shall ensure that the employee passes an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT). Procedures for both QLFT and QNFT are listed in 29 CFR 1910.134, (f), Fit testing, and Appendix A, Fit Testing Procedures. Employees shall be refitted:

- Upon request for a different model, make, or size respirator by the employee.
- When the employee's work conditions change which require a different type respirator.

- A loss or gain of weight, or a change to facial features, such as the growth of facial hair, scarring, etc. occurs.

5.7 Voluntary Use of Respirators and Dust Masks

5.7.1 Respirators

The voluntary use of respirators at DFRC is encouraged even when exposures are below the exposure limits, however, the use of a respirator itself can become a hazard to the wearer if not fitted, cleaned, maintained, and stored properly. Employees at DFRC who choose to wear a respirator when not required by exposure limits shall contact the Respirator Program Administrator who will recommend the best type respirator of the condition in which it will be used. The employee shall obtain a medical clearance and be fit tested. The Respirator Program Administrator or designee will cover the items listed in 29 CFR 1910.134, APPENDIX D, with the employee.

5.7.2 Dust Masks

Dust masks are available at DFRC. They may be used only for nuisance dusts. All applications of use must be pre-approved by the Safety Office. Annual training for dust mask is required, medical clearance and fit testing is not required.

6.0 RECORDS

6.1 Medical Evaluation Records

Medical evaluations will be maintained in accordance with 29 CFR1910.1020 and NPD 1441.1, RECORD RETENTION SCHEDULES; Schedule 1, 127, [1800], (N 11-4).

6.2 Fit Testing and Training Records.

Fit testing, initial, and annual training records shall be maintained by the Respirator Program Administrator for the period the respirator is used by the employee plus three (3) years and then may be destroyed. See NPD 1441.1, RECORD RETENTION SCHEDULES; Schedule 3, 33, [3400], (N 15-39).